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REPLY BRIEF

Applicant	:	Michel J.F. Digonnet
App. No	:	10/616,693
Filed	:	July 10, 2003
For	:	FIBER OPTIC SENSORS WITH REDUCED NOISE
Examiner	:	Dinh D. Chiem
Art Unit	:	2883

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to 37 C.F.R. § 41.39(b) and M.P.E.P. § 1207.03(V), Applicant (Appellant) is submitting this Reply Brief and is requesting that the present appeal be maintained in view of the new ground of rejection in the Examiner's Answer mailed July 3, 2007.

Pursuant to 37 C.F.R. § 41.41, this Reply Brief is being filed within two months from the date of the Examiner's Answer mailed July 3, 2007. This Reply Brief is in compliance with 37 C.F.R. § 41.37(c)(1)(vii), 37 C.F.R. § 41.41, and M.P.E.P. § 1207.03(V)(B).

I. STATUS OF CLAIMS

Claims 16-48 have been canceled without prejudice and Claims 1-15 and 49-57 are currently pending in the application. All of the pending claims were finally rejected by the Examiner in the August 25, 2006 Final Office Action. Rejected Claims 1-15 and 49-57 are the subject of this appeal.

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A) Whether independent Claim 1 and dependent Claims 2, 10-15 and 49-57 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,773,759 issued to Bergh et al. ("Bergh") in view of U.S. Patent No. 6,389,187 issued to Greenaway et al. ("Greenaway") and Phillip Russell, "Photonic Crystal Fibers," Science, Vol. 299, pp. 358-362 (2003) ("Russell").

B) Whether dependent Claims 3-9 are unpatentable under 35 U.S.C. § 103(a) over Bergh in view of Greenaway, and further in view of U.S. Patent No. 6,108,086 issued to Michal et al. ("Michal").

III. ARGUMENT

Rejection of Claims 1, 2, 10-15, and 49-57 under 35 U.S.C. § 103(a) over Bergh in view of Greenaway and Russell

Claim 1

Appellant submits that the Examiner has not established a *prima facie* case of obviousness of Claim 1 under 35 U.S.C. § 103(a) over Bergh in view of Greenaway and Russell. The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness, and if the Examiner does not produce a *prima facie* case, Appellant is under no obligation to submit evidence of nonobviousness. M.P.E.P. § 2142, page 2100-125 (Eighth Edition, Rev. 5, August 2006); *see also, In re Piasecki*, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785 (Fed. Cir. 1984).

To establish a *prima facie* case of obviousness, three basic criteria must be met: (i) the prior art reference (or references when combined) must teach or suggest all the claim limitations; (ii) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; and (iii) there must be a reasonable expectation of success. *See, e.g.*, M.P.E.P. § 2143. As discussed more fully below, Appellant submits that the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. § 103(a).

i. Russell does not support the Examiner's view of the state of the art at the time the present invention was made

If the Examiner was citing Russell merely for the proposition that hollow-core photonic-bandgap fibers were known as of the August 20, 2002 filing date of the U.S. Provisional Patent Application No. 60/405,049 from which the present application claims priority, then Appellant would not dispute this assertion. However, the Examiner is seeking to use Russell to support other propositions regarding the state of the art at the time the present invention was made, and Appellant does dispute these assertions.

In the Examiner's Answer, the Examiner relies upon Russell for support that "at the time of Greenway [*sic*] et al.'s prior art, one having ordinary skill in the art would recognize the term

photonic crystal fiber to be generically referred to both species of a ***hollow-core photonic crystal fiber*** and ***solid-core photonic crystal fiber***." (Examiner's Answer at page 6, lines 9-12; emphasis in original.) Appellant submits that while Russell confines its discussion of photonic crystal fibers to solid-core photonic crystal fibers (see, e.g., Russell at page 359, third column, lines 8-13), hollow-core photonic crystal fibers with cores filled with air (see, e.g., Russell at page 360, second column, lines 30-37) or with a selected gas (see, e.g., Russell at page 361, second column, lines 15-20), and photonic crystal fibers in which the core contains small dielectric particles (see, e.g., Russell at page 361, second column, line 63 – third column, line 4), such discussion cannot be interpreted to be the full and complete extent of the scope of the term "photonic crystal fibre" as used by Greenaway. Appellant does not dispute that the term "photonic crystal fibre" as used by Greenaway is a generic term which includes species of solid-core photonic-bandgap fibers, hollow-core photonic-bandgap fibers, multicore photonic-bandgap fibers including at least one solid core and at least one hollow core, and photonic-bandgap fibers in which an otherwise hollow core is filled with solid particles or a fluid (e.g., liquid or gas). However, to the extent that the Examiner is asserting that persons skilled in the art at the time the present invention was made would understand the generic term "photonic crystal fibre" as used by Greenaway to encompass only the species of solid-core photonic-bandgap fibers and hollow-core photonic-bandgap fibers, Appellant disputes that Russell supports such a conclusion.

ii. Russell is improperly applied as prior art to the present application

Appellant submits that Russell does not qualify as prior art to the present application under any of the subsections of 35 U.S.C. § 102. Russell has a date of publication of January 17, 2003. The present application claims priority to U.S. Provisional Patent Application No. 60/405,049, filed August 20, 2002. Because Russell was published after the priority date of the present application, Russell does not qualify as prior art to the present application. Therefore, Appellant submits that the use of Russell in the rejection of Claim 1 of the present application is improper.

In particular, Appellant submits that the Examiner is improperly using Russell to provide motivation for persons skilled in the art to replace the conventional fiber disclosed by Bergh with

a hollow-core photonic-bandgap fiber. The Examiner states that (Examiner's Answer, page 6, lines 2-17; emphasis in original):

> Russell also points out the advantage of a hollow core fiber does not suffer as much bending loss as conventional fiber (Russell, page 360, 3rd column, 3rd paragraph). Examiner respectfully points out, this bending loss would occur in the loop (14) of Bergh's prior art. The advantage of having less bending loss in a photonic crystal fiber is presented by Knight et al. and Sorensen et al. in 1998 and 2001, respectively. Finally, Russell summarizes the known applications of PCF includes lasers, amplifiers, and ***sensors*** (presented by MacPherson et al. 2001, and Monro et al. 2001).
>
> ... The prior art of Bergh in view of Greenaway and Russell teach one skilled in the art to modify the conventional optical fiber loop (14), which is coupled by the second and third port, with a hollow-core photonic crystal fiber loop for the purpose of reducing bending loss, reducing cross-talk characteristics, low chromatic dispersion, and ultra-high nonlinearity characteristics; together all of the superior characteristics of a hollow-core photonic crystal fiber significantly improves the sensing operation that is taught by Bergh.

As discussed above, Appellant submits that any citation to Russell as prior art to the present application is inappropriate since the present application has a priority date before the publication of the Russell reference. Therefore, Russell cannot be relied upon to provide any features or motivations to combine references to reject Claim 1 of the present application, as the Examiner has improperly sought to do.

Furthermore, Appellant submits that the Examiner is misinterpreting the disclosure of Russell, and that Russell does not provide the motivation to modify Bergh that the Examiner ascribes to Russell. For example, the Examiner cites Russell at page 360, 3rd column, 3rd paragraph as disclosing that a hollow-core photonic-bandgap fiber has less bending losses than does a conventional fiber. However, this passage of Russell states that (emphasis added):

> Conventional fibers suffer additional loss if bent more tightly than a certain critical radius R_{crit}, which depends on wavelength, core-cladding refractive index step, and most notably, the third power of core radius a^3. For wavelengths longer than a certain value (the "long wavelength bend edge"), all guidance is effectively lost. **PCF does not escape this effect, and, in fact, in its endlessly single-mode form PCF exhibits an unexpected short wavelength bend edge caused by bend-induced coupling from fundamental to higher order modes, which of course leak out of the core.**

In this way, Russell actually discloses that beyond the standard bending losses characterized by the long wavelength bend edge suffered by conventional fibers, photonic crystal fibers also suffer from **additional** bending losses (characterized by a short wavelength bend edge) that are not found in conventional fibers. This interpretation is supported by the references cited by Russell (Knight et al. and Sorensen et al. reference, neither of which has been cited by the Examiner as prior art). Therefore, Russell does not provide a motivation to modify Bergh to "reduc[e] bending loss" by replacing the conventional fiber with a hollow-core photonic crystal fiber as suggested by the Examiner.

As a further example, at page 11, lines 1-4 of the Examiner's Answer, the Examiner cites Russell at page 358, 3rd column, 2nd paragraph as disclosing that:

> photonic crystal fibers "could carry more power, could be used for sensing, could act as a better host for rare-earth ions, had multiple cores, had higher nonlinearities, or had high birefringence or widely engineerable dispersion" ... These characteristics are motivations for one skilled in the art to modify Bergh prior art with the disclosure of Greenaway sensor that utilizes photonic crystal fibers.

However, Appellant submits that this quoted passage of Russell actually lists attributes that Russell discloses were not satisfied by conventional fibers. Even if this passage is interpreted as listing attributes of photonic crystal fibers, Appellant submits that Russell does not disclose or suggest that any of these attributes would provide a motivation to replace the conventional fiber of Bergh with a hollow-core photonic crystal fiber. For example, the Examiner does not explain how having multiple cores, higher nonlinearities, higher birefringence, or engineerable dispersion would be seen by persons skilled in the art as being motivations to replace the conventional fiber of Bergh with the multicore photonic crystal fiber of Greenaway. Also, the proposed motivation of "act[ing] as a better host for rare-earth ions" would not apply to hollow-core photonic crystal fibers since the core of such a fiber is hollow.

In addition, the Examiner cites page 361, first column, lines 37-39 of Russell as disclosing that the known applications of photonic crystal fibers include optical sensors as presented by MacPherson et al. 2001 and Monro et al. 2001 (neither of which has been cited by the Examiner as prior art) such that "the combination of prior arts of Bergh, Greenaway, and

Russell would teach one having ordinary skill in the art the Appellant's claimed invention." (Examiner's Answer, page 9, lines 15-19.) However, the MacPherson and Monro references disclose bend or displacement sensors comprising a multicore photonic crystal fiber having solid cores, similar to that of Greenaway. As disclosed by Greenaway at column 12, lines 36-65, such sensors are dependent on the different strains induced in the two solid cores by deformation of the fiber. Appellant submits that a hollow-core photonic-bandgap fiber would not experience such strains (since the core is hollow). Therefore, the displacement sensors of MacPherson and Monro (as well as that of Greenaway) can not be relied upon as disclosing a hollow-core photonic-bandgap fiber being used as an optical sensor, let alone in a configuration as recited by Claim 1 of the present application. Therefore, this passage of Russell is not proper for providing a motivation to modify the disclosure of Bergh as suggested by the Examiner.

iii. Russell teaches away from the modification of Bergh in view of Greenaway

Appellant submits that rather than providing a motivation to modify Bergh in view of Greenaway, Russell actually teaches away from such a modification. As described above, Russell discloses that the hollow-core photonic crystal fiber would suffer from additional bending losses than would the conventional fiber of Bergh. Furthermore, at page 360, second column, line 56 – third column, line 27, Russell discloses that (i) low attenuation is desirable in applications utilizing long lengths of optical fiber, (ii) the best reported attenuation per unit length of hollow-core photonic crystal fibers was 13 dB/km, versus 0.2 dB/km for conventional fibers, and (iii) it is not clear that hollow-core photonic crystal fibers will ever match the low attenuation losses of conventional fibers.

The prior art teaches that such bending losses and attenuation losses of hollow-core photonic crystal fibers would adversely impact the optical device disclosed by Bergh. For example, at column 5, lines 40-45, Bergh discloses using an optical fiber having "approximately 1000 turns of fiber wound on a form having a diameter of 14 centimeters," which is equal to a total length of about 1.5 kilometers. Even omitting the bending losses of the hollow-core photonic crystal fiber, the attenuation loss cited by Russell for such fibers (13 dB/km) would place the optical device of Bergh outside the range of acceptable inertial accuracies quoted by Bergh. (See, Bergh at column 23, lines 17-43 and column 25, lines 31-45.)

Therefore, Russell's teachings of the inferior bending losses and attenuation of hollow-core photonic crystal fibers as compared to conventional fibers indicates that the optical system disclosed by Bergh would not work for its intended purpose if modified to use a hollow-core photonic-bandgap fiber and that such losses would discourage persons skilled in the art from using such hollow-core photonic-bandgap fibers in the optical system disclosed by Bergh. In this way, Russell teaches away from modifying Bergh as proposed by the Examiner. (*See, e.g., In re Gurley*, 27 F.3d 551, 31 U.S.P.Q.2d 1130 (Fed. Cir. 1994); *In re Haruna*, 249 F.3d 1327, 58 U.S.P.Q.2d 1517 (Fed. Cir. 2001).)

iv. Claim 1 includes limitations not taught or suggested by Bergh in view of Greenaway

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). As discussed above, Russell is not prior art to the present application since Russell was published after the priority date of the present application. Appellant submits that the Examiner has not established a *prima facie* case of obviousness because Claim 1 includes limitations not taught or suggested by the combination of Bergh in view of Greenaway.

As pending, Claim 1 recites (emphasis added):

> 1. An optical sensor comprising:
>
> a light source having an output that emits a first optical signal;
>
> a first directional coupler comprising at least a first port, a second port and a third port, the first port optically coupled to the light source to receive the first optical signal emitted from the light source, the first port optically coupled to the second port and to the third port such that the first optical signal received by the first port is split into a second optical signal output by the second port and a third optical signal output by the third port;
>
> **a hollow-core photonic-bandgap fiber having a hollow core surrounded by a cladding**, the hollow-core photonic-bandgap fiber optically coupled to the second port and to the third port to form an optical loop such that the second optical signal and the third optical signal counterpropagate through the hollow-core photonic-bandgap fiber and return to the third port and the second port, respectively, the cladding of the hollow-core photonic-bandgap fiber substantially confining the counterpropagating second optical signal and third optical signal within the hollow core; and

an optical detector located at a position in the optical sensor to receive the counterpropagating second and third optical signals after the second and third optical signals have traversed the hollow-core photonic-bandgap fiber.

As acknowledged in the Examiner's Answer, Bergh does not disclose or suggest that the optical fiber loop comprises "a hollow-core photonic-bandgap fiber having a hollow core surrounded by a cladding," as recited by Claim 1. Greenaway discloses an optical fiber bend sensor that sends optical signals along an optical fiber having multiple cores, twice through a first core and then twice through a second core. (Greenaway at column 10, line 49 – column 11, line 15.) Interference patterns in the light that propagates through the two cores are used to detect bends in the optical fiber. (Greenaway at column 11, lines 15-32.) Greenaway further discloses that the multi-core fiber "may be a photonic crystal fibre." (Greenaway at column 4, lines 44-45.)

However, as discussed above, Greenaway discloses that the bend sensor utilizes differences in the strains applied to the multiple solid cores of the fiber. (Greenaway at column 12, lines 36-65.) Since a hollow-core fiber would not provide such strains, Appellant submits that the disclosure of Greenaway of "photonic crystal fibres" can not be interpreted as including hollow-core photonic crystal fibers and must be interpreted as referring solely to solid-core photonic crystal fibers.

In the alternative, if the disclosure of Greenaway is interpreted to refer to the genus of photonic crystal fibers, then Appellant submits that the term "photonic crystal fiber" refers to the structure of the cladding of the fiber, and does not specify whether one or more of the cores are hollow or not. Used in this way, the term "photonic crystal fibre" is a broad term which includes optical fibers with one or more hollow cores, one or more solid cores, combinations of hollow cores and solid cores, and otherwise hollow cores filled with various solid or fluid materials. The Russell reference, which was improperly applied by the Examiner as prior art as discussed above, is also in accordance with this interpretation. Thus, by merely disclosing a "photonic crystal fibre," Greenaway does not disclose or suggest a "hollow-core photonic-bandgap fiber having a hollow core," as recited by Claim 1.

Appellant submits that the disclosure of the genus of "photonic bandgap fibers" does not teach the species of "hollow-core photonic-bandgap fiber having a hollow core," as recited by Claim 1. Disclosure of a genus in not inherent disclosure of all the species of the genus. (*See, e.g., Corning Glass Works v. Sumitomo Elec. U.S.A.*, 868 F.2d 1251, 9 U.S.P.Q.2d 1962 (Fed. Cir. 1989); *Metabolite Laboratories, Inc. v. Laboratory Corp. of Am. Holdings*, 370 F.3d 1354, 71 U.S.P.Q.2d 1081 (Fed. Cir. 2004).) "Earlier disclosure of a genus does not necessarily prevent patenting a species member of the genus." *Eli Lilly & Co. v. Board of Regents of the University of Washington*, 334 F.3d 1264, 67 U.S.P.Q.2d 1161 (Fed. Cir. 2003); *see also*, *Bristol-Myers Squibb Co. v. Ben Veue Laboratories, Inc.*, 246 F.3d 1368, 1380 (Fed. Cir. 2001).

Furthermore, pursuant to M.P.E.P. § 2112(IV) (Rev. 5, August 2006, page 2100-47), "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic" (emphasis in original; citing *In re Rijckaert*, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)). The mere fact that a certain thing may result from a given set of circumstances is not sufficient. "Inherency may not be established by probabilities or possibilities." *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999). To establish inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)(emphasis in original).

Appellant submits that Greenaway does not inherently refer to a "hollow-core photonic-bandgap fiber" as recited by Claim 1. The generic term "photonic-crystal fiber" includes fibers with one or more hollow cores, one or more solid cores, combinations of hollow cores and solid cores, and otherwise hollow cores filled with various solid or fluid materials, so the term "photonic crystal fibre" as used by Greenaway cannot be relied upon as a disclosure of a "hollow-core photonic-bandgap fiber," as recited by Claim 1. Furthermore, Appellant submits that by omitting consideration of the "hollow-core" feature recited by Claim 1, the Examiner has failed to consider the claimed invention as a whole as required under the *Graham* test for patentability. (*Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459 (S.Ct. 1966); *see, also*

M.P.E.P. § 2143.03; *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970)("All words in a claim must be considered in judging the patentability of that claim against the prior art.")). Thus, the Examiner has not satisfied his burden to show that all the features of Claim 1 are taught or suggested by the prior art, so Claim 1 is nonobvious under 35 U.S.C. § 103.

v. No suggestion/motivation to modify Bergh in view of Greenaway and Russell

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is an apparent reason at the time of the invention for persons skilled in the art to combine the prior art elements in the fashion claimed by the patent application at issue. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, 14-15 (2007). A proper analysis of obviousness requires (1) a determination that the prior art provides a suggestion to persons skilled in the art to make the claimed device, and (2) a determination that the prior art also reveals to persons skilled in the art that there is a reasonable expectation of success. (*See, e.g., In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).) Appellant submits that at the time of the invention, there was no reason for persons skilled in the art to combine the teachings of Bergh and Greenaway to produce the system recited by Claim 1.

In particular, Appellant submits that there is no suggestion or motivation in the prior art to modify Bergh in view of Greenaway and Russell to utilize a photonic-bandgap fiber having a hollow core. In the Examiner's Answer, the Examiner cites various attributes of photonic crystal fibers as providing motivations to modify the disclosed system of Bergh by replacing the conventional fiber with a hollow-core photonic-bandgap fiber. However, the Examiner has not provided any rationale for why these various attributes of photonic crystal fibers would motivate persons skilled in the art to make this modification. (*See, e.g., In re Lee*, 277 F.3d 1338, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002); *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for the combination in the manner claimed").) The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. (M.P.E.P. § 2143.01(III), page 2100-128, Rev. 5, August 2006; *see also, In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990).) Thus, merely being capable of

modification is insufficient to provide the required suggestion or motivation to combine the cited references to present a *prima facie* case of obviousness.

In the Examiner's Answer, the Examiner states that "Greenway's [*sic*] **motivation** for using a photonic crystal fiber as an alternative is for its compact size and reduced crosstalk characteristics" (emphasis in original). However, Appellant submits that these motivations cited by the Examiner are attributed by Greenaway to multicore fibers and not to photonic crystal fibers.

For example, at column 4, lines 28-43, Greenaway actually attributes the characteristics of compactness while maintaining low crosstalk to multicore fibers, not to photonic crystal fibers. At column 4, lines 29-49, Greenaway discloses that multicore fibers (emphasis added):

> comprise multiple fibre cores, each with an associated cladding "region". Each cladding region is smaller in cross-sectional area than would be required for typical cladding of cylindrical symmetry. **This enables the cores to be more closely spaced than previously permitted, with regard to the requirements for avoiding crosstalk.** This in turn results in an overall reduction of the diameter of a multicore cable. ...
>
> Alternatively, the multicored fibre may be a photonic crystal fibre. This again provides the advantage of compactness. **A photonic crystal fibre is another example of a multicored fibre in which crosstalk can be kept to an acceptable level, but overall fibre diameter is reduced in relation to a traditionally structure fibre bundle.**

At column 17, lines 38-42, Greenaway further discloses that a multicore photonic fiber can have its cores more closely spaced than a standard multicore fiber. Thus, Greenaway discloses that **multicore fibers** provide the advantage of compactness while keeping crosstalk between the cores to an acceptable level, and that multicore photonic bandgap fibers also provide these advantages. The purported advantages cited by the Examiner are actually attributable to multicore fibers and are not properly used as motivations to modify the teachings of Bergh by using a hollow-core photonic-bandgap fiber. Therefore, Greenaway does not provide the motivation to utilize a hollow-core photonic-bandgap fiber with the configuration of Bergh.

Appellant further submits that the prior art does not provide persons skilled in the art with a reasonable expectation of success for modifying the optical system of Bergh by utilizing a photonic-bandgap fiber having a hollow core. As discussed above, Russell discloses that hollow-

core photonic crystal fibers suffer from more bending and attenuation losses than do conventional fibers and Bergh discloses that such losses would result in the optical system disclosed by Bergh not working for its intended purpose. Therefore, there would not be a reasonable expectation of success of the system of Bergh modified as proposed by the Examiner.

For the above-stated reasons, Appellant submits that Bergh, Greenaway, and Russell do not provide a motivation to use photonic crystal fibers in the configuration disclosed by Bergh, so Claim 1 is nonobvious under 35 U.S.C. § 103.

Claims 2, 10-15, and 49-57

If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.3d 1596 (Fed. Cir. 1988). Each of Claims 2, 11, 12, 14, and 49 depends from Claim 1, each of Claims 10 and 52-55 depends from Claim 2, Claim 13 depends from Claim 12, Claim 15 depends from Claim 14, each of Claims 50 and 51 depends from Claim 49, Claim 56 depends from Claim 55, and Claim 57 depends from Claim 56. Thus, each of Claims 2, 10-15, and 49-57 includes all the limitations of Claim 1 as well as other limitations of particular utility. Therefore, Appellant submits that Claims 2, 10-15, and 49-57 are also nonobvious under 35 U.S.C. § 103.

Rejection of Claims 3-9 under 35 U.S.C. § 103(a) over Bergh in view of Greenaway and Michal

As discussed above with regard to Claim 1, Appellant submits that the combination of Bergh in view of Greenaway does not disclose or suggest all the limitations of Claim 1 and that the prior art does not provide a motivation to modify the teachings of Bergh in view of Greenaway. Appellant submits that Michal does not disclose or suggest the limitations of Claim 1 which are missing from the combination of Bergh in view of Greenaway. Appellant further submits that Michal does not provide a motivation to combine Bergh, Greenaway, and Michal. Therefore, Claim 1 is patentably distinguished over the combination of Bergh, Greenaway, and Michal.

If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.3d 1596 (Fed. Cir. 1988). Claim 3 depends from Claim 2 which depends from Claim 1, and each of Claims 4-9 depends from

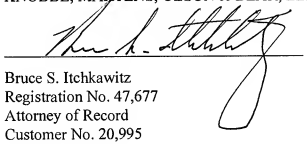
Claim 2. Thus, each of Claims 3-9 includes all the limitations of Claim 1 as well as other limitations of particular utility. Therefore, Appellant submits that Claims 3-9 are also nonobvious under 35 U.S.C. § 103.

Conclusion

In view of the foregoing, Appellant respectfully submits that the rejections of Claims 1-15 and 49-57 are not well founded. Appellant therefore respectfully requests that the Board reverse the rejection of Claims 1-15 and 49-57.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP



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